Department of State Health Services
Health Service Region 1
Epidemiology Response Team

EPI Tōme
Newsletter

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"Please be kind…report on time!"

LEGIONELLOSIS

Most people will not get pneumonia from relaxing in a hot tub, visiting a water park or using the shower in a hotel while traveling. However, thousands of people each year in the United States get sick with legionellosis, a respiratory illness which can be contracted from water related activities.

The provisional number of cases of legionellosis in the United States reported to CDC by December 14, 2013 is 4,431. For 2012, a total of 3,496 cases were reported. In Texas, the 2012 case count was 158, with an incidence rate of 0.6/100,000 people. In 2011, the case count was 111 with an incidence rate of 0.4/100,000 people. In contrast, 17 cases were reported in Texas with an incidence rate of 0.1/100,000 people in 2001. Legionellosis is a nationally notifiable condition and should be reported within one week to your local health jurisdiction or Texas DSHS HSR 1.

Legionnaires' disease is an acute respiratory infection caused by the bacterium *Legionella*. The bacterium is named after a 1976 outbreak, when many people who went to a Philadelphia convention of The American Legion suffered from this type of pneumonia. A milder infection also caused by *Legionella* is called Pontiac fever. The term legionellosis may be used to refer to either Legionnaires' disease or Pontiac fever.

Pontiac fever is a milder flu-like illness (fever, chills and malaise) WITHOUT pneumonia that occurs in epidemics and is characterized by an abrupt onset and is self- limited. The incubation period is 24-72 hours after exposure. Hospitalization is uncommon with Pontiac fever. The CDC estimates the attack rate is >90% and a case-fatality rate of 0% for persons exposed to the source of a Pontiac fever outbreak.

Legionnaires' disease has an incubation period of 2-14 days after exposure. The clinical presentation of Legionnaires' disease is pneumonia, cough, and fever. Symptoms commonly include headache, fatigue, weight loss, body aches, and fever. Non-productive cough, abdominal pains, and diarrhea occur in many patients. Central nervous system and renal manifestations may occur. Many patients will experience fatigue, loss of energy, and difficulty concentrating for several months afterwards. In patients with Legionnaires' disease, the pneumonia may progress to cause death. Legionnaires 'disease cannot be distinguished clinically or radiographically from pneumonia caused by other agents, and evidence of infection with other respiratory pathogens does not rule out the possibility of concomitant *Legionella* infection. The CDC estimates that each year 8,000-18,000 patients are hospitalized with Legionnaires' disease in the United States. The CDC estimates the attack rate is <5% and the case fatality rate is 5-30% for persons exposed to the source of a Legionnaire's disease outbreak. More illness is found in the summer and early fall but can happen anytime of the year.

Legionellosis may occur in any age, but most commonly occurs in patients who are over 50 years of age, immunocompromised, or otherwise in poor health with conditions like cancer, diabetes, kidney failure or chronic lung disease. Current or former smokers and heavy drinkers have increased risk for legionellosis. Persons with organ transplants are also at high risk as the medications used to protect the new organ also compromise the patient's defense system against infection. There is no evidence for person to person spread of the disease.

Most people contract legionellosis by inhaling mist that comes from a water source (e.g. showers, cooling towers, whirlpool baths) that is contaminated with *Legionella* bacteria. Hot water tanks, potable (drinking) water systems, large plumbing systems, respiratory therapy devices, and decorative fountains may be sources as well. *Legionella* can be found in natural, freshwater environments, but they are present in insufficient numbers to cause disease. *Legionella* does not seem to grow in car or window air-conditioners. Most people exposed to the *Legionella* bacteria do not become ill. Aspiration is also a way that the bacteria enter into the lungs to cause pneumonia. More than 20% of the cases reported to the CDC are travel related. Outbreaks among travelers can be difficult to detect because of low attack rate, long incubation period, and dispersal of persons from the source of the outbreak. Timely reporting of travel-associated cases could allow early identification and control of known sources of infection.

Aerosolized water contaminated with *Legionella* bacteria can be a source of infection, like the mist found in the shower.

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Table 1: Select reportable conditions, including confirmed, probable, and suspect cases (as applicable)
in DSHS HSR 1, including all public health jurisdictions, for the period January 01, 2011 through December 31, 2013 by Month/Year. Second six months comparison.
Data source: Texas NEDSS Database. Data extracted: 01/30/2014. These counts are generated by DSHS HSR1. 2013 data is preliminary and subject to change.

Condition	2011							2012							2013							2013 Total	2012 Total	2011 Total
	Jul	Aug	Sep	Oct	Nov	Dec	6 mo Total	Jul	Aug	Sep	Oct	Nov	Dec	6 mo Total	Jul	Aug	Sep	Oct	Nov	Dec	6 mo Total			
Amebiasis																						1	1	
Campylobacteriosis	17	16	20	16	6	8	83	19	27	15	14	16	7	98	23	30	26	26	13	10	128	185	178	136
Creutzfeldt-Jakob Disease																								2
Cryptosporidiosis	4	5	6	2			17	3	1			2	1	7	7	4	6	3	3	2	25	28	8	31
Cyclosporiasis																						1		
Encephalitis, West Nile									1		1			2		9	15	3			27	27	2	
Haemophilus influenzae, invasive																	1				1	1		
Hemolytic uremic synd,postdiarrheal	1						1											1			1	1	1	6
Hepatitis A, acute	1		1			1	3										3	1	1		5	5	2	4
Hepatitis B Viral Infection, Perinatal										1				1									1	
Hepatitis B, acute			3		1	1	5															4	2	6
Hepatitis C, acute			2				2																1	3
Influenza-associated pediatric mortality																							1	
Legionellosis	1	2					3				1			1		2					2	2	1	5
Listeriosis	1	2	1				4									1					1	1		4
Lyme disease																1					1	1	1	
Malaria					1		1								1	1					2	4	1	1
Mumps				1	1		2									1					1	1		2
Neisseria meningitidis, invasive									1					1								1	1	1
Pertussis	2			1	2		5	6	2	1		4		13	31	25	17	18	24	22	137	161	21	16
Salmonellosis	35	21	35	28	19	13	151	15	16	21	13	18	10	93	16	10	14	19	17	11	87	149	172	220
Shiga toxin-producing Escherichia coli	2	2	3	1		1	9	1	1	3	4		1	10	1	1	2	1	1		6	8	16	21
Shigellosis	20	9	9	24	18	21	101	15	11	19	17	32	3	97	1	4	1	3	2		11	28	178	210
Spotted Fever Rickettsiosis					1		1						1	1									1	1
Streptococcus pneumoniae, inv. disease	3	3	12	4	15	14	51	3	3	7	5	6	9	33	1	1	6	8	3	5	24	71	90	127
Streptococcus, invasive Group A			1	2	1	2	6		1	1		3	5	10	1	1	1		1	4	8	26	19	19
Streptococcus, invasive Group B		3	4	6	6	6	25	4	6	9	3	3	5	30	3	4	1	5	4	2	19	41	51	46
Typhoid fever (Salmonella typhi)																								1
Vancomycin-intermediate Staph aureus						1	1																	1
Varicella (Chickenpox)	2	2	5	2	6	13	30	2	3	3	5	8	4	25	3	4	5	8	2	3	25	45	61	62
Vibrio vulnificus infection																							1	
Vibriosis, other or unspecified									2					2									2	
West Nile Fever								1						1		13	17	1			31	31	1	
Yersiniosis																						1		

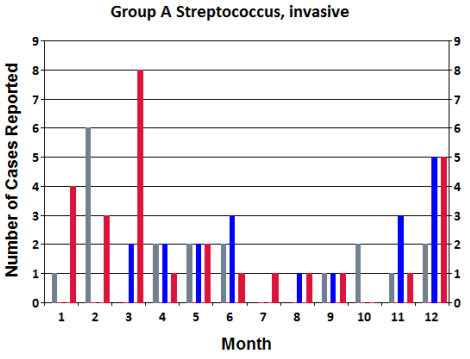
Note: West Nile Encephalitis and West Nile Fever were not officially reported in the NEDSS database during 2011 and 2012.

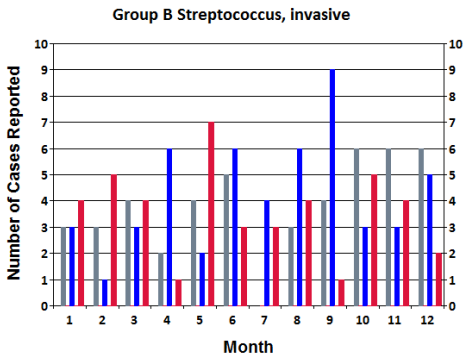
Chart 1: Select reportable conditions, including confirmed, probable, and suspect cases (as applicable) in DSHS HSR 1, including all public health jurisdictions, for the period January 01, 2011 through December 31, 2013 by Month/Year.
Data source: Texas NEDSS Database. Data extracted: 01/30/14. These counts are generated by DSHS HSR1. 2013 data is preliminary and subject to change.

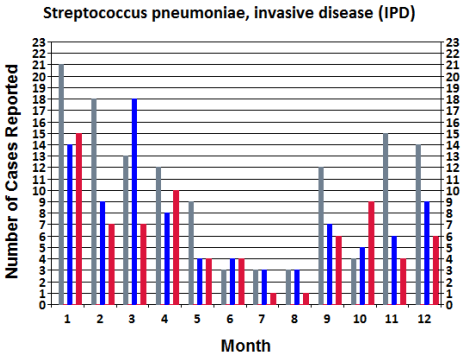
LEGEND

2011 2012 2013

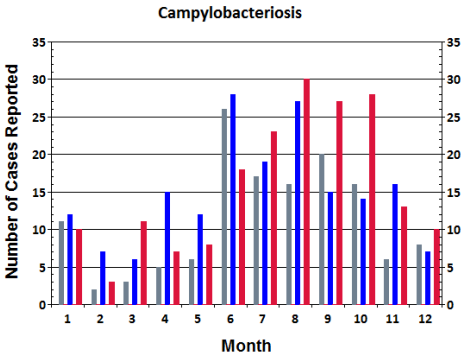
Invasive Streptococcal Disease

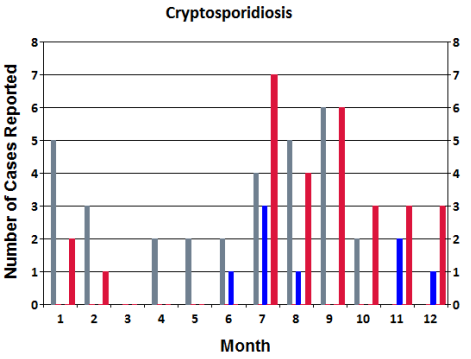


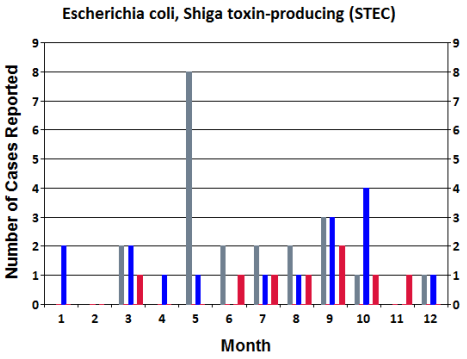


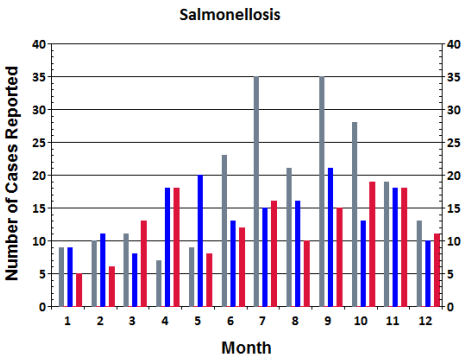


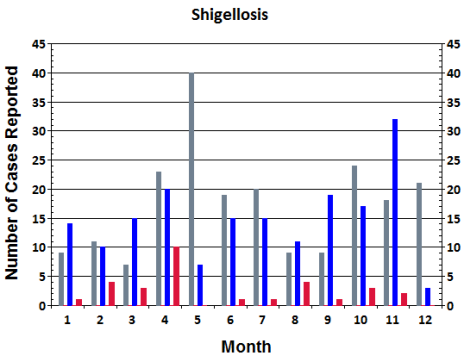
Foodborne/Waterborne Disease

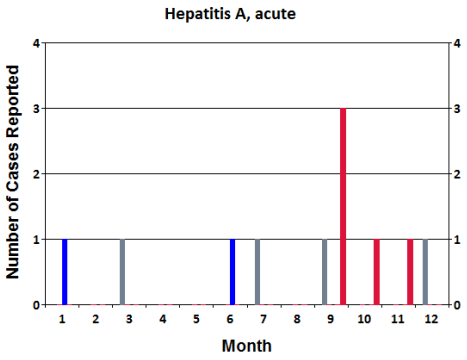




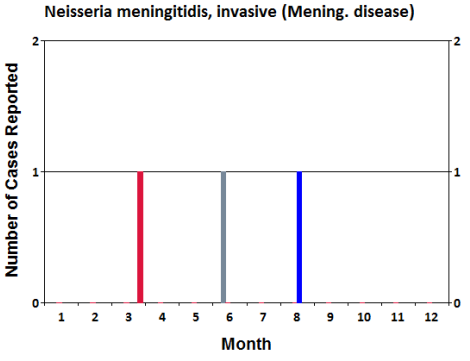


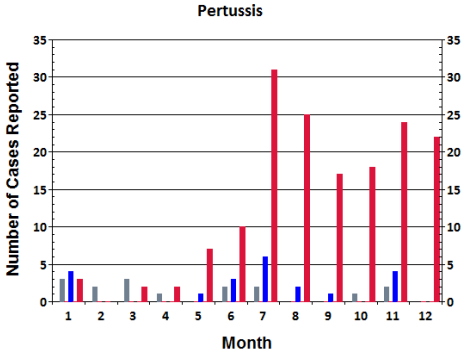


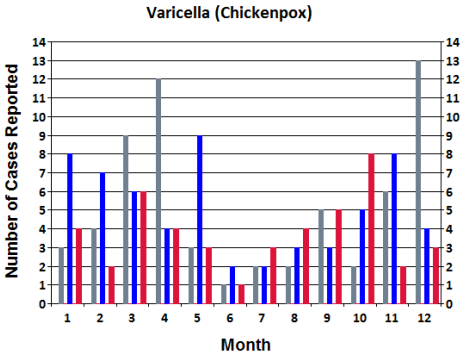




Other Vaccine Preventable Disease







FIVE IMPORTANT FACTS A CLINICIAN NEEDS TO KNOW ABOUT LEGIONELLOSIS:

1. **WHO TO TEST:** Recognize patients who have risk/exposures/ clinical presentations common to legionellosis. Refer to BOX #1 for patients who should be tested.
2. **TESTING:** The most commonly used laboratory test for diagnosis is the urine antigen test. See BOX #2 for more information.
3. **CASE CRITERIA:** The Department of State Health Services Infectious Disease Control Unit establishes Case Definitions and Classifications for reporting in Texas. See BOX #3 for definitions.
4. **TREATMENT:** Prompt diagnosis and appropriate treatment of legionellosis leads to better patient outcomes. Refer to **BOX #4** for guidance.
5. **PREVENTION:** The key to preventing legionellosis is maintenance of water systems. See **BOX #5** for prevention measures and guidelines.

BOX #1: PATIENTS WHO SHOULD BE TESTED FOR LEGIONNAIRES' DISEASE ARE:

- Patients who have failed response to outpatient antibiotic therapy.
- Patients with severe pneumonia, especially those requiring intensive care.
- Immunocompromised host with pneumonia.
- Patients with pneumonia in a setting of a legionellosis outbreak.
- Patients who have traveled away from their home within 2 weeks before onset of illness.
- Patients suspected of healthcare associated pneumonia.

BOX #2: LABORATORY TESTING

Laboratory confirmatory tests (tests required for classification as a confirmed Legionellosis case):

- Isolation (culture) of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid, OR
- Detection of *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents, OR
- Demonstration of seroconversion by a fourfold or greater rise in specific serum antibody titer between paired acute and convalescent phase serum specimens to *Legionella pneumophila* serogroup 1 using validated reagents.

Sensitivity varies depending on the quality and timing of specimen collection as well as technical skill of the laboratory performing the test. The following table provides the sensitivity and specificity of tests available for Legionellosis.

TEST	SENSITIVITY (%)	SPECIFICITY (%)
Culture	20-80	100
Urine antigen	70-100	100
Paired serology	80-90	>99
Direct fluorescent antibody stain	25-75	≥ 95
PCR	Unknown	Unknown

BOX #3: CASE CRITERIA

CASE DEFINITION

Legionellosis is associated with two clinically compatible and epidemiologically distinct illnesses: Legionnaires' disease, which is characterized by fever, myalgia, cough, clinical or radiological pneumonia, and Pontiac fever, a milder illness without pneumonia.

CASE CLASSIFICATIONS:

Confirmed: A clinically compatible case that meets at least one of the confirmatory lab criteria.
Travel-associated: A case that has a history of spending at least one night away from home, either in the same country of residence or abroad, in the ten days before onset of illness.

BOX #4: TREATMENT

For Legionnaires' disease, intravenous azithromycin has replaced erythromycin as the drug of choice. Once the condition of the patient is improving, oral therapy can be substituted. Levofloxacin (or other fluoroquinolone) is the drug of choice for immunocompromised patients. Duration of therapy is 5-10 days for azithromycin and 14-21 days for other drugs. Longer courses of therapy are recommended for patients who are immunocompromised or who have severe disease. Please see the most recent guidelines from the Infectious Diseases Society of America (IDSA) for treatment of community-acquired pneumonia: (http://www.journals.uchicago.edu/doi/pdf/10.1086/511159)

If your patient has Pontiac fever, antibiotic therapy should not be prescribed. It is a self- limited illness that does not benefit from antibiotic treatment. Complete recovery usually occurs within one week.

BOX #5: PREVENTION

- Cooling towers should be drained when not in use and mechanically cleaned periodically to remove scale and sediment. Appropriate biocides should be used to limit the growth of *Legionella* and the formation of protective biofilms.
- Maintaining hot water system temperature at 50 degrees C or higher may reduce the risk of transmission.
- Tap water should not be used in respiratory therapy devices.
- Monochloramine (rather than free chlorine) treatment of municipal water supplies has been associated with a decrease in health care-associated Legionnaires' disease.
- Hospitals should maintain hot water at the highest temperature allowable by state regulations or codes, preferably 60◦ C (140◦F) or greater, and maintain cold water temperatures at less than 20◦ C (68◦ F) to minimize waterborne *Legionella* contamination.
- Persons at increased risk of infection may choose to avoid high-risk exposures, such as being in or near a hot tub.

Guidelines for appropriate water temperatures and chemical treatment of water for legionellosis prevention can be found in ASHRAE Guideline 12-2000.

Sources:
http://www.cdc.gov/legionella/index.html
http://www.dshs.state.tx.us/idcu/disease
Red Book 2012 Report of the Committee on Infectious Diseases
http://legionella.org/publications/non-visible/ashrae-guideline-12-2000/
Additional information may be found at: http://www.dshs.state.tx.us/idcu/disease/legionnaires/taskforce